Hecate Strait Herring Survey July 22 - August 8, 1985 *G.B. Reed* Cruise 85-8

P. B. McCarter, C. W. Haegele, D. C. Miller, and D. E. Hay

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

November 1986

Canadian Data Report of Fisheries and Aquatic Sciences No. 615

87-00729/

Canadian Data Report of Fisheries and Aquatic Sciences

Data reports provide a medium for filing and archiving data compilations where little or no analysis is included. Such compilations commonly will have been prepared in support of other journal publications or reports. The subject matter of data reports reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Data reports are not intended for general distribution and the contents must not be referred to in other publications without prior written authorization from the issuing establishment. The correct citation appears above the abstract of each report. Data reports are abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1–25 in this series were issued as Fisheries and Marine Service Data Records. Numbers 26–160 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Data Reports. The current series name was introduced with the publication of report number 161.

Data reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport statistique canadien des sciences halieutiques et aquatiques

Les rapports statistiques servent à classer et à archiver les compilations de données pour lesquelles il y a peu ou point d'analyse. Ces compilations auront d'ordinaire été préparées à l'appui d'autrès publications ou rapports. Les sujets des rapports statistiques reflètent la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports statistiques ne sont pas destinés à une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans autorisation écrite préalable de l'établissement auteur. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports statistiques sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1 à 25 de cette série ont été publiés à titre de relevés statistiques, Services des pêches et de la mer. Les numéros 26 à 160 ont été publiés à titre de rapports statistiques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 161.

Les rapports statistiques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Data Report of
Fisheries and Aquatic Sciences No. 615

November 1986

HECATE STRAIT HERRING SURVEY JULY 22 - AUGUST 8, 1985
G.B. REED CRUISE 85-8

by

P. B. McCarter, C. W. Haegele, D. C. Miller, and D. E. Hay

Department of Fisheries and Oceans
Fisheries Research Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

(c) Minister of Supply and Services Canada 1986

Cat. No. Fs 97-13/615E ISSN 0706-6465

Correct citation for this publication:

McCarter, P. B., Haegele, C. W., Miller, D. C., and D. E. Hay. 1986. Hecate Strait herring survey July 22 - August 8, 1985 G.B. REED Cruise 85-8. Can. Data Rep. Fish. Aquat. Sci. 615: 35 p.

ABSTRACT

McCarter, P. B., C. W. Haegele, D. C. Miller, and D. E. Hay. 1986. Hecate Strait herring survey July 22 - August 8, 1985 G.B. REED Cruise 85-8. Can. Data Rep. Fish. Aquat. Sci. 615: 35 p.

Hecate Strait and Chatham Sound were surveyed to examine summer feeding distributions of Pacific herring (Clupea harengus pallasi) and stomach contents of herring and associated midwater fishes. Herring were caught with midwater trawl on the Two Peaks, Ramsay Island and S.W. Horseshoe fishing grounds along the 70-100 m bottom contour. Schools were scattered and close to the bottom during the day and dispersed throughout the water column during the night. Sounding records, midwater trawl and plankton tow positions, catches and biological sampling data are presented.

Key words: herring, summer distribution, stomach contents, Hecate Strait

RESUME

McCarter, P. B., C. W. Haegele, D. C. Miller, and D. E. Hay. 1986. Hecate Strait herring survey July 22 - August 8, 1985 G.B. REED Cruise 85-8. Can. Data Rep. Fish. Aquat. Sci. 615: 35 p.

On a effectué des relevés dans le détroit d'Hécate et le passage Chatham afin de déterminer la distribution estivale du hareng du Pacifique (Clupea harengus pallasi) en phase d'alimentation ainsi que les contenus stomacaux de l'espèce et d'autres poissons mésopélagiques associés. À l'aide de chaluts semi-pélagiques, on a capturé du hareng dans les pêcheries de Two Peaks, de l'Île Ramsay et de la partie sud-ouest du Horseshoe à des courbes de niveau allant de 70 à 100 m. Pendant la journée, les bancs, éparpillés, se tenaient près du fond tandis que la nuit, ils étaient dispersés dans toute la colonne d'eau. Des données de sondage, les positions de relevés du plancton et du chalut semi-pélagique et des données sur les prises et l'échantillonnage biologique sont aussi présentées.

Mots-clés: hareng, distribution estivale, contenus stomacaux, détroit d'Hécate

INTRODUCTION

A research cruise by the G.B. REED was conducted in July-August of 1985 with two primary objectives. The first was to determine if there is a relationship between overwintering, inshore aggregations and subsequent summer distributions of herring found offshore along the trawling edges of Hecate Strait. Knowledge of seasonal distributions contributes to our understanding of the relationships among herring stocks. The second objective was to identify fish predators of young herring and determine the diet of herring and other midwater fish during their summer feeding period. Information from this survey also contributes to the Hecate Strait Project in which the overall objective is to map fish assemblages and develop an ecological basis for mixed-species assessment and management techniques.

AREA OF SURVEY

Echo sounding records were made at 9 knots using the G.B. REED's Simrad EK 38 Sounder. Twenty-one hundred kilometers (1300 naut. mi.) of transect lines were logged covering ten major geographic locations:

(1) Chatham Sound
(2) McIntyre Bay
(3) Two Peaks
(4) Butterworth Edge
(5) Warrior Ground
(6) Freeman - Whiterock Ground
(7) S.W. Bonilla Ground
(8) Horseshoe Ground
(9) Ramsay - Reef Island Ground
(10) SE/NE Goose Island Ground

Transects based on Loran C lines were plotted perpendicular and across the fifty fathom bottom contour. Most sounding lines were two nautical miles (M) apart and 5-20 M in length (Fig. 1). Bottom depths in the 60 m to 120 m range were searched most intensively. The number, intensity, depth, and size of echogram traces encountered during both day and night soundings were recorded and subjectively identified as plankton layers, herring schools or other midwater fish, or groundfish (Table 1).

SAMPLING METHODS

FISHING

Twelve trawl tows using a Diamond 5 midwater trawl with 3 m^2 Suberkrub doors were made during the cruise (Fig. 2). Catches were brought aboard, sorted by species into tubs and weighed to the nearest kg (Tables 2 and 3). Random samples of stomachs were preserved by the injection of 10 percent formalin into the body cavity until it was visibly swollen. Injection was accomplished using hypodermic syringes with heavy gauge needles. Injected fish were placed in plastic buckets and frozen for later analysis at the Pacific Biological Station. Table 4 summarizes samples collected.

PLANKTON TOWS

Ninety-nine oblique plankton tows were made using 0.25 m^2 Bongos equipped with 350 µm and 500 µm black Nitex nets of modified SCOR design (Fig. 1). General Oceanics flowmeters with low speed rotors were used to measure volume of seawater filtered. Depth of tows varied from 20-100 m and bottom depths at stations were 27-243 m. Tows lasted 3-16 minutes at vessel speeds of 2 knts. Cable descent rates were 50 m/min and the ascent rates were 20 m/min. Recovered nets were washed with a high pressure hose and samples preserved in 10 percent buffered seawater formalin. A Bongo tow log is contained in Table 5.

HYDROGRAPHIC STATIONS

Expendable bathythermograph (X.B.T.) casts were completed at 13 stations (Fig. 3 and Table 8). Six vertical plankton hauls were completed but only samples from stations 13, 21, and 24 were retained due to specimen jar breakage during heavy seas. A 0.25 m^2 SCOR net was used to obtain these samples but was lost overboard at station 15 when a cable splice broke, precluding further hauls.

SAMPLING RESULTS

STOMACH CONTENTS

Eight hundred and thirty-two fish comprising seven species were sampled for length, weight, sex, and stomach analysis. Length-sex frequencies for herring, pollock and rockfishes are recorded in Tables 6a, 6b, and 6c. The preserved contents of 344 stomachs from these fish have been examined microscopically. Euphausiids, amphipods, copepods, and chaetognaths were most abundant. Stomachs from herring caught N.E. of Graham Island on the Two Peaks fishing ground were often full (6.6 percent w/w of total mean body weight) while those S.E. of Moresby Island were half full or near empty. The copepod Calanus pacificus was the dominant food item at Two Peaks whereas the euphausiid Thysanoessa spinifera and the amphipod Parathemisto sp. dominated at S.E. Moresby Island locations where the herring were much larger in size. Pollock stomachs from Two Peaks were frequently half full or less with the euphausiid Thysanoessa spinifera while S.E. Moresby rockfish stomachs were dominated by the amphipod Parathemisto sp. Table 6d summarizes stomach content data from fish species sampled.

PLANKTON SAMPLES

Five hundred and ninety-eight fish larvae were separated by family, counted, and standard length measured to the nearest 0.2 mm using an ocular micrometer. Larval identifications were based on descriptions and drawings (Garrison and Miller 1982). Relative abundance estimates of fish larvae from single tows ranged from 0 to 215 larvae per 1000 m^3 of seawater filtered. Cottids (sculpins) were present in most Hecate Strait tows and comprised 49 percent of the total larvae captured. Osmerids (eulachon) comprised 21 percent of the total and were captured adjacent to the Nass River (Chatham Sound and Northern Hecate Strait). Six herring larvae measuring 18.2-23.7 mm in length were caught 3-7 M west of Porcher and Stephens Islands. Mean lengths and numbers of fish larvae collected are summarized in Table 7.

SEAWATER TEMPERATURES

Seawater temperatures determined by expendable bathythermograph averaged 13.7°C at the surface, 11.7°C at 10 m depth, 10.2°C at 20 m depth, 9.2°C at 30 m depth and decreasing to 5.3-6.5°C at bottom depths of 91-437 m. Table 8 shows seawater temperatures at hydrographic stations.

CONCLUSIONS

Concentrations of herring are more diffuse in summer than during the fall and winter months. However, as in the winter, they still retain a geographic association with the 100 m (or 50 fathom) edge. Their summer distribution resembles their winter distribution which generally has major concentrations in the Browning Entrance area (Kieser et al. in prep.) and Juan Perez Inlet (McCarter and Hay 1985). These two major winter areas appear to correspond to the two major northern spawning sites: (1) the combined Chatham Sound - Porcher Island area for northern mainland herring and (2) Juan Perez - Skincuttle Inlets for southern Queen Charlotte Island fish.

During summer it appears that there are still herring in the winter sites, but they are spread over a greater distance along the 100 m contour. In the north, they appear to extend to the "Two Peaks" area (Fig. 1). Herring were not abundant but a substantial catch (2700 kg) was made there (Tow 6). Typical echogram herring signs were observed also on transects in the Browning Entrance area, and off Juan Perez Inlet, where some catches of herring also were made.

ACKNOWLEDGMENTS

We thank Alf Fletcher, skipper of the G.B. REED and crew for assistance throughout the cruise. Dr. Charles Low examined and identified stomach contents. Students, Tom Hollingshead and John Argue, assisted in sample collection. Michele Durban and Carole Goodall assisted in sample processing.

REFERENCES

Garrison, K. J. and Miller, B. S. 1982. Review of the early life history of Puget Sound fishes. Nat. Marine Fish. Service (NOAA) Seattle, Washington.

Hart, J. L. 1973. Pacific fishes of Canada. Fish. Res. Board Can. Bull. 180.

Kieser, R., D. E. Hay, C. W. Haegele, D. C. Miller, and T. J. Mulligan. 1986 (In press). Hydroacoustic herring survey results and trawl catches from Hecate Strait, Oct. 15 to Nov. 5, 1984. G.B. REED cruise GBR84C and M.V. CANADIAN #1 cruise CAN84-1. Can. Data Rep. Fish. Aquat. Sci.

McCarter, P. B. and D. E. Hay. 1985. Herring survey off Queen Charlotte Islands and Hecate Strait January 15-31, 1985. Can. Data Rep. Fish. Aquat. Sci. 543: 39 p.

Table 1. Sounding log of G.B. REED Cruise 85-8 (July 22 - Aug. 8, 1985). Simrad EK38 Gain setting=2.

Location Transect name	Date Time	Length (naut. miles)	Duration (min)	Number & Intensity of echogram traces (S=several)	Depth of target (fms)	Depth of bottom (fms)	Probable target
Bonilla Is. to Two Peaks	24.07.85						
1	1610	14.1	106	S - Light	50-60	30-70	PK
2	1756	13.2	94	2 - Light	70-80	70-80	PK
3	1930	29.8	213	2 - Light	30	20-60	PK
	25.07.85						
4	1653	29.0	212	2 - Medium	-	20-60	H
5	2057	12.9	88	S - Light	70-80	20-80	GF
6	2226	12.2	98	S - Light	60-80	20-80	PK
	26.07.85						
7	0004	11.7	117	S - Light	5-10	25	PK
8	0140	11.4	88	S - Light	5-10	25	PK
9	0312	11.9	88	S - Light	5-10	25	PK
10	0440	13.4	103	3 - Heavy	10-20	20-25	H
11	0623	20.0	130	S - Light	10-30	20-30	H
12	0846	22.7	174	8 - Medium	10-40	20-40	H
13	1150	15.7	105	S - Light	16-20	40	PK
14	1610	17.0	121	S - Light	20-40	20-40	PK
15	1811	9.4	59	S - Medium	16-20	20	GF
16	1925	14.8	113	S - Medium	20-25	25	GF
17	2139	11.7	84	S - Light	10-30	20-50	PK
18	2303	13.0	106	S - Light	30	30	GF
	27.07.85						
19	0049	17.6	118	None	-	-	-
20	0317	20.5	128	1 - Light	10-12	15	PK
21	0547	7.2	53	1 - Light	10-70	70	PK
22	0640	8.0	66	2 - Light	10-40	40-60	PK
23	0746	10.2	62	1 - Light	25-50	40-60	PK
24	1130	11.3	95	1 - Light	42-52	52	PK
25	1305	5.5	59	1 - Light	30-44	44	PK
Two Peaks to McIntyre Bay							
26	1404	7.7	67	S - Medium	20-40	114	MF
27	1625	7.8	53	S - Medium	20-50	80-90	MF
28	1718	10.2	84	S - Medium	40-60	60-110	MF
29	1842	6.8	59	S - Medium	50-70	90-100	MF
30	1941	13.0	102	S - Medium	40-100	60-100	-
31	2118	8.8+	103	2 - Light	6-12	65	PK
32	2352	9.4	83	None	-	-	-

Table 1 (cont'd)

Location Transect name	Date Time	Length (naut. miles)	Duration (min)	Number & Intensity of echogram traces (S=several)	Depth of target (fms)	Depth of bottom (fms)	Probable target
Two Peaks to McIntyre Bay (cont'd)							
	28.07.85						
33	0115	8.9+	81	S - Medium	3-5	25-30	-
34	0236	18.5	83	None	-	-	-
35	0459	17.1	142	S - Medium	18-22	20-30	-
36	0736	22.8	190	S - Heavy	18-45	20-45	MF
37	1204	13.5	70	S - Medium	32-34	32-34	H
Chatham Sound							
	30.07.85						
38	0949	9.1	56	1 - Light	20-30	>120	PK
39	1100	7.6	66	1 - Light	25-35	>120	PK
40	1223	8.4	51	1 - Light	30-70	70-150	PK
41	1314	6.6	27	1 - Light	20-70	80-85	PK
42	1415	4.6	32	1 - Light	50-60	62	PK
43	1745	7.2	62	1 - Light	20-50	30-100	PK
44	1905	7.2	47	1 - Light	20-70	40-90	PK
45	1952	6.2	58	1 - Light	30-40	40-75	PK
46	2050	6.2	42	1 - Light	var.	30-90	PK
47	2143	6.9	71	None	-	-	-
48	2316	6.0	20	None	-	-	-
Banks Is.							
	31.07.85						
49	0636	10.2	81	None	-	-	-
50	0757	3.7	25	1 - Medium	20-30	70	PK
51	0840	3.0	20	None	-	-	-
52	0900	3.8	42	None	-	-	-
53	0942	3.0	24	None	-	-	-
54	1026	5.0	32	None	-	-	-
55	1058	16.5	138	1 - Medium	70	100	PK

Table 1 (cont'd)

Location Transect name	Date Time	Length (naut. miles)	Duration (min)	Number & Intensity of echogram traces (S=several)	Depth of target (fms)	Depth of bottom (fms)	Probable target
Banks Is. (cont'd)							
	31.07.85						
56	1316	7.0	50	S - Medium	30-45	45	CF
57	1406	1.8	12	S - Medium	40-50	50	CF
58	1418	8.0	53	S - Medium	30-80	50-100	CF/PK
59	1525	6.6	42	S - Medium	50-70	120	CF
60	1607	6.5	55	None	-	-	-
61	1702	3.9	26	None	-	-	-
62	1745	7.3	57	S - Light	60-80	110	PK
Bonilla Is. to Horseshoe							
	01.08.85						
63	1154	19.6	169	S - Medium	30-50	52	H
64	1453	12.9	134	None	-	-	-
65	1707	14.6	135	S - Light	25-40	30-50	-
66	1936	14.0	124	S - Light	30-40	50	-
67	2210	16.7	119	3 - Medium	10-50	22-80	H
	02.08.85						
68	0009	13.0	111	None	-	-	-
69	0200	15.6	120	S - Light	28-32	32	CF
70	0400	13.9	117	None	-	-	-
71	0623	16.3	110	None	-	-	-
72	0813	13.8	114	1 - Light	50-70	70	CF
73	1007	10.6	74	S - Light	26-30	30	-
74	1132	9.2	83	None	-	-	-
75	1309	12.4	87	None	-	-	-
76	1436	13.0	102	None	-	-	-
77	1608	14.8	92	S - Light	10-24	24	H
78	1751	13.4	93	None	-	-	-
79	2145	11.1	66	1 - Light	30-36	36	-
Horseshoe to Laskeek Bay							
80	2251	8.9	81	2 - Light	30-60	36-60	-
	03.08.85						
81	0012	13.6	81	None	-	-	-
82	0145	12.5	96	S - Light	28-34	34	CF
83	0340	11.9	66	None	-	-	-
84	0446	10.9	90	None	-	-	-
85	0616	10.5	72	S - Medium	20-30	30-40	H
86	0736	6.8	47	S - Medium	30-45	40-45	H
87	1145	5.9	37	None	-	-	-
88	1239	11.4	77	S - Medium	30-64	45-70	H
89	1658	12.2	73	S - Medium	30-40	36-40	H
90	1811	11.6	89	7 - Heavy	30-60	35-80	H

Table 1 (cont'd)

Location Transect name	Date Time	Length (naut. miles)	Duration (min)	Number & Intensity of echogram traces (S=several)	Depth of target (fms)	Depth of bottom (fms)	Probable target
Horseshoe to Laskeek Bay (cont'd)							
91	1940	12.4	78	9 - Heavy	10-60	20-90	H/PK
92	2116	12.3	90	2 - Light	8-75	20-75	PK
93	2310	12.3	80	None	-	-	-
	04.08.85						
94	0030	11.2	82	2 - Medium	40-60	60-70	GF
95	0152	25.5	159	None	-	-	-
96	0436	25.8	174	S - Light	60-90	30-90	GF
97	0745	13.8	84	None	-	-	-
98	0909	11.1	82	1 - Medium	80-90	90-100	GF
99	1051	4.3	29	1 - Medium	80-90	92-100	GF
Selwyn Inlet							
100	1125	18.4	110	S - Medium	60-80	85-120	GF
Atli Inlet							
101	1335	10.6	61	S - Light	50-70	70-110	GF
Goose Is.	05.08.85						
102	1127	26.8	166	S - Medium	80-90	95-100	GF
103	1441	28.3	221	S - Light	70-90	90-110	GF
104	1855	31.8	194	S - Light	5-70	20-80	GF

[1]Footnotes:
PK - Plankton layer
H - Herring school
MF - Other midwater fish (pollock)
GF - Groundfish

Table 2. Midwater trawl locations and species compositions of catches made by the G.B. REED, July 22 - August 8, 1985.

Tow number	1	2	3	4
Date (Day/Mo.)	26/07	27/07	28/07	28/07
Time (P.D.S.T.)	13:19	09:15	08:55	17:38
Duration (min)	47	36	37	70
Location	10 mi. SW Seal Rks.	Two Peaks	McIntyre Bay	Rose Spit
Latitude (°')	53° 53.9'	54° 20.1'	54° 11.3'	54° 16.3'
Longitude (°')	130° 59.4'	131° 03.4'	132° 02.1'	131° 31.6'
Bottom depth (m)	84	77	81	112
Net depth (m)	64	59	60	92
Speed (kts)	3.2	3.4	3.0	2.5
Warp length (m)	183	183	183	229
Thresher shark	-	-	-	-
Spiny dogfish	39	-	-	-
Pacific herring	-	-	-	-
Chum salmon	-	-	-	-
Eulachon	-	Tr.	-	-
Walleye pollock	-	-	Tr. Juven.	196
Pacific ocean perch	-	-	-	-
Silvergray rockfish	-	-	-	8
Widow rockfish	561	-	-	-
Yellowtail rockfish	-	-	-	5
Quillback rockfish	-	-	-	-
Redstripe rockfish	-	-	-	-
Harlequin rockfish	-	-	-	-
Pygmy rockfish	-	-	-	-
Sharpchin rockfish	-	-	-	-
Lingcod	-	-	19	-
Arrowtooth flounder	1	14	-	15
Pacific halibut	-	-	-	-
Jellyfish	-	-	-	-
Euphausiids	-	-	-	-
Total catch (kg)	601	14	19	224

Tr. = Trace (<1 kg)

Table 2 (cont'd)

Tow number	5	6	7	8
Date (Day/Mo.)	29/07	29/07	30/07	01/08
Time (P.D.S.T.)	08:35	11:21	15:51	08:35
Duration (min)	85	49	64	60
Location	Two Peaks	Two Peaks	Chatham Sound	Whiterocks
Latitude (°')	54° 22.5'	54° 18.2'	54° 32.6'	53° 46.4'
Longitude (°')	131° 18.0'	131° 14.3'	130° 32.0'	130° 45.7'
Bottom depth (m)	160	86	141	135
Net depth (m)	82	65	61	92
Speed (kts)	2.2	2.9	3.5	3.2
Warp length (m)	229	137	183	275
Thresher shark	-	-	-	-
Spiny dogfish	-	-	-	-
Pacific herring	-	2700	-	-
Chum salmon	-	3	-	-
Eulachon	-	-	Tr.	Tr.
Walleye pollock	83	9	-	3
Pacific ocean perch	-	-	-	1
Silvergray rockfish	-	-	-	1
Widow rockfish	-	-	-	-
Yellowtail rockfish	-	12	-	-
Quillback rockfish	-	-	-	-
Redstripe rockfish	-	-	-	-
Harlequin rockfish	-	-	-	-
Pygmy rockfish	-	-	-	-
Sharpchin rockfish	-	-	-	-
Lingcod	-	8	-	-
Arrowtooth flounder	-	-	-	1
Pacific halibut	-	-	-	-
Jellyfish	Tr.	-	Tr.	-
Euphausiids	-	-	-	Tr.
Total catch (kg)	83	2732	Tr.	7

Tr. = Trace (<1 kg)

Table 2 (cont'd)

Tow number	9	10	11	12
Date (Day/Mo.)	03/08	03/08	04/08	04/08
Time (P.D.S.T.)	09:04	14:10	17:28	18:57
Duration (min)	60	60	35	30
Location	SW of Horseshoe	10 mi. NE Skudder Pt.	Ramsay Is.	Ramsay Is.
Latitude (°')	52° 39.4'	53° 34.9'	52° 36.0'	52° 35.4'
Longitude (°')	130° 59.8'	131° 04.3'	131° 16.5'	131° 16.7'
Bottom depth (m)	81	113	122	124
Net depth (m)	46	93	-	-
Speed (kts)	3.0	2.4	2.7	3.6
Warp length (m)	137	229	229	229
Thresher shark	-	180	-	-
Spiny dogfish	-	-	-	-
Pacific herring	34	7	-	32
Chum salmon	-	-	-	-
Eulachon	-	-	-	-
Walleye pollock	-	-	-	Tr. Juven.
Pacific ocean perch	-	Tr.	-	-
Silvergray rockfish	-	-	-	-
Widow rockfish	-	2	-	-
Yellowtail rockfish	-	-	-	-
Quillback rockfish	-	-	-	-
Redstripe rockfish	-	15	-	-
Harlequin rockfish	-	Tr.	-	-
Pygmy rockfish	Tr.	6	-	-
Sharpchin rockfish	-	-	-	Tr.
Lingcod	-	-	-	-
Arrowtooth flounder	-	-	-	-
Pacific halibut	5	-	-	-
Jellyfish	-	Tr.	-	Tr.
Euphausiids	-	-	-	Tr.
Total catch (kg)	39	210	0	32

Tr. = Trace (<1 kg)

Table 3. Scientific and common names[1] of species captured.

Common name	Scientific name
Thresher shark	*Alopias vulpinus*
Spiny dogfish	*Squalus acanthias*
Pacific herring	*Clupea harengus pallasi*
Chum salmon	*Oncorhynchus keta*
Eulachon	*Thaleichthys pacificus*
Walleye pollock	*Theragra chalcogramma*
Pacific ocean perch	*Sebastes alutus*
Silvergray rockfish	*Sebastes brevispinis*
Widow rockfish	*Sebastes entomelas*
Yellowtail rockfish	*Sebastes flavidus*
Quillback rockfish	*Sebastes maliger*
Redstripe rockfish	*Sebastes proriger*
Harlequin rockfish	*Sebastes variegatus*
Pygmy rockfish	*Sebastes wilsoni*
Sharpchin rockfish	*Sebastes zacentrus*
Lingcod	*Ophiodon elongatus*
Arrowtooth flounder	*Atheresthes stomias*
Pacific halibut	*Hippoglossus stenolepis*

[1]After Hart (1973)

Table 4. Summary of species sampled, type of sample, location, and number of specimens examined from G.B. REED Cruise 85-8 July 22 - August 8, 1985.

Species	Tow no.	Location	Number of fish measured	Sex		Fish and stomach weights	Stomachs examined
				Male	Female		
Dogfish	1	10. mi SW Seal Rks.	31	19	12	0	0
Herring	6	Two Peaks	100	43	57	100	50
	9	SW Horseshoe	100	48	52	100	50
	10	10 mi. NE Skudder Pt.	60	25	35	60	50
	12	3 mi. E Ramsay Is.	100	56	44	100	50
Pollock	4	Two Peaks	95	27	68	95	25
	5	Two Peaks	67	26	41	67	25
Widow Rockfish	1	10 mi. NE Skudder Pt.	100	56	44	100	25
Redstripe Rockfish	10	10 mi. NE Skudder Pt.	76	46	30	76	25
Pygmy Rockfish	10	10 mi. NE Skudder Pt.	84	0	84	84	25
Turbot	2	Two Peaks	19	-	-	19	19
Total			832	-	-	801	344

Table 5. Hecate Strait plankton log July-August, 1985.

Transect Station name	Line out (m) depth	Sampling date	Sampling time	Net depth (m)	Flowmeter revolutions Left 500µm net	Flowmeter revolutions Right 350µm net	Bongo station coordinates Latitude	Bongo station coordinates Longitude
1	060	24.07.85	1602	42	03791	*	53° 42' 41"	130° 30' 40"
2	120	24.07.85	1834	85	12199	12140	53° 39' 48"	130° 40' 27"
3	035	24.07.85	2253	25	08064	08094	53° 26' 18"	131° 11' 25"
4	060	25.07.85	1847	42	05320	04750	53° 26' 18"	131° 11' 24"
5	100	25.07.85	2041	71	08860	07214	53° 47' 24"	130° 40' 35"
6	120	25.07.85	2306	85	14943	15638	53° 26' 18"	131° 11' 24"
7	050	26.07.85	0110	35	02901	03196	53° 43' 28"	131° 58' 05"
8	097	26.07.85	0222	69	08587	07978	53° 48' 36"	130° 53' 03"
9	084	26.07.85	0314	59	09126	08867	53° 52' 07"	130° 51' 03"
10	088	26.07.85	0527	62	05880	05272	53° 51' 35"	130° 57' 03"
11	040	26.07.85	0821	28	10189	10413	54° 44' 48"	131° 16' 34"
12	060	26.07.85	1004	42	07003	06487	53° 52' 38"	131° 05' 26"
13	050	26.07.85	1140	35	09753	10244	54° 00' 00"	130° 54' 30"
14	073	26.07.85	1701	52	05637	05455	53° 57' 48"	131° 05' 00"
15	050	26.07.85	1905	35	09431	09604	53° 58' 45"	131° 08' 10"
16	120	26.07.85	2014	85	08551	07700	54° 04' 31"	131° 01' 21"
17	140	26.07.85	2125	99	09701	09176	54° 10' 05"	130° 54' 50"
18	140	26.07.85	2344	99	12727	12700	54° 09' 00"	131° 02' 08"
19	024	27.07.85	0233	17	04595	04010	54° 03' 20"	131° 20' 55"
20	027	27.07.85	0425	19	05038	04726	54° 10' 55"	131° 08' 36"
21	108	27.07.85	0535	76	08815	08784	54° 18' 04"	130° 58' 11"
22	120	27.07.85	0704	85	09030	09053	54° 16' 46"	131° 06' 36"
23	070	27.07.85	1110	50	10000	09889	54° 17' 44"	131° 12' 04"
24	078	27.07.85	1205	55	14107	14334	54° 21' 02"	131° 07' 53"
25	100	27.07.85	1311	71	09520	09487	54° 25' 27"	131° 02' 49"
26	140	27.07.85	1429	99	14084	14319	54° 24' 08"	131° 14' 19"
27	140	27.07.85	1559	99	14053	14009	54° 23' 14"	131° 19' 33"
28	053	27.07.85	1725	38	04451	04481	54° 17' 42"	131° 15' 15"
29	140	27.07.85	1855	99	09379	09400	* * *	* * *
30	140	27.07.85	2106	99	08033	08796	54° 21' 50"	131° 39' 37"
31	140	27.07.85	2157	99	13358	13280	54° 17' 52"	131° 37' 42"
32	120	27.07.85	2159	85	10719	10669	54° 25' 00"	131° 00' 00"
33	140	28.07.85	0145	99	14163	14251	54° 13' 48"	131° 45' 49"
34	140	28.07.85	0428	99	12239	12096	54° 19' 13"	132° 07' 10"
35	111	28.07.85	0556	79	04735	*	54° 12' 47"	132° 00' 08"
36	040	28.07.85	0726	28	10757	10672	54° 07' 58"	131° 56' 23"
37	124	28.07.85	1252	88	09569	09473	54° 12' 23"	132° 17' 42"
38	140	30.07.85	1032	99	15338	14741	54° 39' 00"	130° 39' 36"
39	140	30.07.85	1126	99	15390	*	54° 37' 11"	130° 33' 22"
40	140	30.07.85	1211	99	11373	11185	54° 35' 23"	130° 29' 14"
41	140	30.07.85	1336	99	10823	10692	54° 33' 02"	130° 34' 49"
42	095	30.07.85	1451	67	07232	07087	54° 31' 00"	130° 39' 39"
43	120	30.07.85	1807	85	11843	11493	54° 28' 58"	130° 34' 44"

Table 5 (cont'd)

Transect Station name	Line out (m) depth	Sampling date	Sampling time	Net depth (m)	Flowmeter revolutions Left 500µm net	Flowmeter revolutions Right 350 µm net	Bongo station coordinates Latitude	Bongo station coordinates Longitude
44	045	30.07.85	1855	32	08171	07921	54° 27' 02"	130° 30' 44"
45	140	30.07.85	2011	99	15022	14068	54° 24' 58"	130° 34' 52"
46	100	30.07.85	2124	71	07802	07719	54° 22' 54"	130° 40' 29"
47	140	30.07.85	2204	99	12430	12278	54° 21' 00"	130° 36' 30"
48	140	30.07.85	2303	99	16610	15298	54° 18' 58"	130° 35' 23"
49	140	31.07.85	0709	99	13150	13018	53° 29' 41"	130° 41' 16"
50	140	31.07.85	0827	99	14428	14217	53° 21' 56"	130° 43' 43"
52	140	31.07.85	0913	99	13473	13079	53° 21' 12"	130° 38' 16"
54	110	31.07.85	1011	78	11073	10921	53° 20' 52"	130° 31' 42"
55	140	31.07.85	1158	99	13379	13303	53° 12' 43"	130° 27' 22"
56	080	31.07.85	1340	57	07270	07258	53° 09' 54"	130° 11' 18"
58	140	31.07.85	1514	99	10831	10692	53° 05' 38"	130° 13' 47"
60	075	31.07.85	1633	53	07658	07615	53° 04' 19"	130° 00' 37"
62	140	31.07.85	1731	99	11839	11627	53° 03' 56"	129° 53' 02"
63	100	01.08.85	1139	71	09598	*	53° 33' 25"	130° 47' 30"
64	090	01.08.85	1545	64	07794	07562	53° 24' 11"	130° 59' 31"
65	060	01.08.85	1906	42	07755	07355	53° 17' 45"	131° 06' 46"
66	100	01.08.85	2021	71	13272	12766	53° 19' 57"	130° 57' 21"
67	140	01.08.85	2143	99	17839	17695	53° 22' 31"	130° 47' 54"
68	087	02.08.85	0053	62	09943	09850	53° 15' 11"	130° 56' 02"
69	042	02.08.85	0340	30	05211	05214	53° 07' 45"	131° 04' 48"
70	097	02.08.85	0450	69	08249	09037	53° 10' 25"	130° 54' 37"
71	140	02.08.85	0602	99	15248	15230	53° 12' 29"	130° 46' 29"
72	120	02.08.85	0901	85	15846	15782	53° 06' 32"	130° 51' 58"
73	035	02.08.85	1112	25	09255	08197	53° 02' 24"	130° 54' 06"
74	102	02.08.85	1202	72	08439	08191	53° 03' 16"	130° 48' 06"
75	100	02.08.85	1257	71	07957	07752	53° 04' 25"	130° 41' 06"
76	106	02.08.85	1509	75	07779	07744	52° 59' 53"	130° 43' 56"
77	047	02.08.85	1731	33	05259	05159	52° 53' 44"	130° 49' 30"
78	070	02.08.85	0739	50	06519	06527	52° 56' 05"	130° 40' 47"
79	140	02.08.85	2124	99	17241	17554	52° 59' 26"	130° 30' 25"
80	120	02.08.85	2316	85	12858	12639	52° 50' 06"	130° 38' 26"
81	038	03.08.85	0120	27	08444	08269	52° 51' 32"	130° 52' 30"
82	088	03.08.85	0225	62	07156	08869	52° 46' 58"	130° 45' 59"
83	117	03.08.85	0117	83	10420	09255	52° 43' 36"	130° 41' 59"
84	084	03.08.85	0523	59	08236	07017	52° 43' 18"	130° 52' 00"
85	060	03.08.85	0714	42	06266	04283	52° 42' 35"	131° 00' 43"
86	100	03.08.85	0802	71	14215	14018	52° 38' 57"	130° 56' 48"
87	095	03.08.85	1214	67	08523	09671	52° 35' 13"	130° 55' 41"
88	117	03.08.85	1307	83	08361	08284	52° 33' 35"	130° 03' 19"
89	140	03.08.85	1644	99	10074	10040	52° 31' 16"	131° 12' 26"
90	110	03.08.85	1844	78	11229	11399	52° 36' 55"	131° 08' 06"

Table 5 (cont'd)

Transect Station name	Line out (m) depth	Sampling date	Sampling time	Net depth (m)	Flowmeter revolutions Left 500µm net	Flowmeter revolutions Right 350µm net	Bongo Station Coordinates Latitude	Bongo Station Coordinates Longitude
91	050	03.08.85	2045	35	08925	09374	52° 42' 02"	131° 04' 25"
92	100	03.08.85	2155	71	07343	08509	52° 40' 09"	131° 13' 06"
93	140	03.08.85	2251	99	13635	13874	52° 38' 41"	131° 20' 38"
94	093	04.08.85	0106	66	09070	08908	52° 44' 27"	131° 16' 02"
95	034	04.08.85	0416	24	07431	07221	52° 59' 47"	130° 53' 55"
96	030	04.08.85	0553	21	06738	06762	52° 53' 42"	131° 09' 55"
97	100	04.08.85	0733	71	11048	11117	52° 47' 47"	131° 26' 28"
98	030	04.08.85	0943	21	07022	07107	52° 53' 48"	131° 20' 26"
99	140	04.08.85	1034	99	15563	15654	52° 53' 12"	131° 27' 26"
100	140	04.08.85	1255	99	15039	14846	52° 18' 06"	131° 43' 06"
101	140	04.08.85	1425	99	10726	10738	52° 44' 11"	131° 33' 02"
102	140	05.08.85	1359	99	11351	11402	51° 44' 27"	128° 24' 48"
103	038	05.08.85	1600	27	07112	06775	51° 36' 23"	128° 39' 58"
104	140	05.08.85	1827	99	15857	*	51° 26' 38"	128° 57' 20"

Table 6a. Size composition of herring (Clupea harengus pallasi), numbers sampled by haul and sex for G.B. REED Cruise 85-8, July 22 - August 8, 1985.

Tow number	6			9			10			12		
Location	Two Peaks			SW Horeshoe			10 mi NE Skudder Pt.			Ramsay Is.		
Standard length (mm)	Sex M	F	T	Sex M	F	T	Sex M	F	T	Sex M	F	T
156-158	-	1	1	-	-	-	-	-	-	-	-	-
159-161	-	0	0	-	1	1	-	-	-	-	-	-
162-164	2	0	2	-	0	0	-	-	-	-	-	-
165-167	0	1	1	-	0	0	-	-	-	-	-	-
168-170	0	0	0	-	0	0	-	-	-	-	-	-
171-173	0	1	1	-	0	0	-	-	-	-	-	-
174-176	0	1	1	-	0	0	-	-	-	-	-	-
177-179	3	2	5	-	1	1	-	-	-	-	-	-
180-182	2	2	4	-	1	1	-	-	-	-	-	-
183-185	2	2	4	-	0	0	-	-	-	-	-	-
186-188	2	3	5	1	0	1	-	-	-	-	-	-
189-191	1	2	3	1	0	1	-	-	-	-	-	-
192-194	2	1	3	1	2	3	-	-	-	-	-	-
195-197	4	8	12	4	4	8	-	1	1	-	-	-
198-200	4	2	6	3	1	4	1	0	1	-	-	-
201-203	4	6	10	4	2	6	3	1	4	1	-	1
204-206	3	1	4	3	4	7	5	4	9	3	1	4
207-209	2	3	5	2	5	7	2	1	3	0	1	1
210-212	6	5	11	7	5	12	3	7	10	4	1	5
213-215	2	6	8	10	6	16	4	4	8	3	4	7
216-218	1	4	5	6	11	17	1	4	5	4	4	8
219-221	0	2	2	3	4	7	2	3	5	3	2	5
222-224	1	0	1	1	1	2	1	4	5	6	5	11
225-227	1	1	2	0	1	1	1	1	2	11	5	16
228-230	1	0	1	0	1	1	1	2	3	7	3	10
231-233	-	1	1	0	0	0	0	1	1	3	11	14
234-236	-	1	1	1	0	1	0	1	1	4	2	6
237-239	-	0	0	1	0	1	0	1	1	3	2	5
240-242	-	0	0	-	0	0	0	-	0	3	3	6
243-245	-	0	0	-	0	0	0	-	0	0	-	0
246-248	-	0	0	-	1	1	0	-	0	1	-	1
249-252	-	0	0	-	0	0	0	-	0	-	-	-
253-255+	-	1	1	-	1	1	1	-	1	-	-	-
Total	43	57	100	48	52	100	25	35	60	56	44	100

modes are underlined for total fish, length frequencies in tables 6a-6c.

Table 6b. Size composition of walleye pollock (Theragra chalcogramma), numbers sampled by haul and sex for G.B. REED Cruise 85-8, July 22 - August 8, 1985.

Tow number	4			5		
Location	Rose Spit			Two Peaks		
	Sex			Sex		
Fork length (cm)	M	F	T	M	F	T
35	-	-	-	-	1	1
36	-	-	-	-	0	0
37	-	-	-	-	1	1
38	-	-	-	-	0	0
39	-	-	-	-	1	1
40	-	-	-	-	0	0
41	1	2	3	2	0	2
42	3	0	3	0	1	1
43	0	1	1	2	0	2
44	2	3	5	1	1	2
45	3	0	3	0	0	0
46	5	1	6	1	2	3
47	3	2	5	0	0	0
48	6	1	7	3	3	6
49	0	3	3	3	3	6
50	3	2	5	1	0	1
51	4	2	6	4	5	9
52	3	2	5	4	5	9
53	3	2	5	2	5	7
54	8	3	11	1	5	6
55	3	1	4	2	6	8
56	6	0	6	-	1	1
57	6	0	6	-	1	1
58	4	1	5	-	-	-
59	2	1	3	-	-	-
60	1	-	1	-	-	-
61	1	-	1	-	-	-
62	1	-	1	-	-	-
63	-	-	-	-	-	-
64	-	-	-	-	-	-
65	-	-	-	-	-	-
Total	68	27	95	26	41	67

Table 6c. Size composition of widow rockfish (Sebastes entomelas), redstripe rockfish (S. proriger), and pygmy rockfish (S. wilsoni), numbers sampled by haul and sex for G.B. REED Cruise 85-8, July 22 - August 8, 1985.

Species	Widow rockfish			Redstripe rockfish			Pygmy rockfish		
Two number	1			10			10		
Location	10 mi. SW Seal Rocks			10 mi. NE Skudder Pt.			10 mi. NE Skudder Pt.		
Fork length (cm)	Sex			Sex			Sex		
	M	F	T	M	F	T	M	F	T
15	-	-	-	-	-	-	-	4	4
16	-	-	-	-	-	-	-	4	4
17	-	-	-	-	-	-	-	9	9
18	-	-	-	3	-	3	-	16	16
19	-	-	-	1	2	3	-	38	38
20	-	-	-	4	1	5	-	12	12
21	-	-	-	4	0	4	-	1	1
22	-	-	-	2	2	4	-	-	-
23	-	-	-	7	3	10	-	-	-
24	-	-	-	14	8	22	-	-	-
25	-	-	-	9	11	20	-	-	-
26	-	-	-	2	2	4	-	-	-
27	-	-	-	-	0	0	-	-	-
28	1	2	3	-	1	1	-	-	-
29	4	5	9	-	-	-	-	-	-
30	17	8	25	-	-	-	-	-	-
31	11	8	19	-	-	-	-	-	-
32	4	7	11	-	-	-	-	-	-
33	5	1	6	-	-	-	-	-	-
34	5	3	8	-	-	-	-	-	-
35	2	5	7	-	-	-	-	-	-
36	0	1	1	-	-	-	-	-	-
37	2	1	3	-	-	-	-	-	-
38	1	0	1	-	-	-	-	-	-
39	2	1	3	-	-	-	-	-	-
40	0	0	0	-	-	-	-	-	-
41	1	0	1	-	-	-	-	-	-
42	0	0	0	-	-	-	-	-	-
43	0	0	0	-	-	-	-	-	-
44	0	0	0	-	-	-	-	-	-
45	1	2	3	-	-	-	-	-	-
Total	56	44	100	46	30	76	0	84	84

Table 6d. Summary of stomach contents by species, location, and haul number (dominant and codominant food items listed).

Predator species	NE Graham Island Midwater Tows	SE Moresby Island Midwater Tows
Herring	Haul 6. Most stomachs full. Copepod, Calanus pacificus	Haul 9. Most stomachs empty. Copepod, Calanus pacificus Haul 10. Most stomachs half full. Euphausiid, Thysanoessa spinifera Amphipod, Parathemisto sp. Haul 12. Most stomachs half full. Amphipod, Parathemisto sp. Euphausiid, Thysanoessa spinifera
Pollock	Haul 4. Most stomachs half full. Euphausiid, Thysanoessa spinifera Crab/Shrimp larvae Haul 5. Most stomachs half full. Euphausiid, Thysanoessa spinifera Crab/Shrimp larvae	No samples.
Widow rockfish	Haul 1. Most stomachs quarter full. Unidentifiable material Crab/Shrimp larvae/Sandlance	No samples.
Redstripe rockfish	No samples.	Haul 10. Most stomachs half full. Amphipod, Parathemisto sp. Euphausiid, Thysanoessa spinifera Copepod, Neocalanus sp.
Pygmy rockfish	No samples.	Haul 10. Most stomachs half full. Amphipod, Parathemisto sp. Euphausiid, Thysanoessa spinifera Copepod, Neocalanus sp.
Turbot	Haul 2. Most stomachs empty. Some sandlance.	No samples.

Table 7. Number and mean length of fish larvae collected on G.B. REED Cruise 85-8, July 22 - August 8, 1985.

Area	Bongo station number	Larval count and mean standard length (mm) by family classification[1]													Total count
		UN	CL	OS	GA	ST	BA	AM	SC	HE	CO	AG	CY	PL	
Bonilla Is. to Two Peaks	1	1 5.3	-	-	-	-	-	-	-	-	4 4.9	-	-	-	5
	2	8 4.1	-	3 25.0	-	-	1 23.2	-	2 11.0	1 12.2	1 4.2	-	1 5.3	-	17
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	4	-	-	-	-	-	-	-	-	-	2 7.3	1 6.0	1 5.1	-	4
	5	-	1 20.3	1 30.0	-	-	-	-	1 4.3	-	1 3.7	-	1 3.7	-	5
	6	3 17.6	2 19.3	7 27.7	-	-	1 29.4	-	-	-	1 12.3	-	-	-	14
	7	-	-	4 24.4	-	-	-	-	-	-	3 7.2	-	-	-	7
	8	2 14.0		3 26.8			1 23.2	-	1 15.7	-	-	-	-	-	7
	9	1 4.3	2 18.2	6 22.0	-	-	-	-	1 15.4	-	-	-	1 5.3	-	11
	10	-	-	10 28.3	-	-	-	-	-	-	3 8.1	-	-	-	13
	11	-	-	-	-	-	-	-	-	-	-	-	4 9.7	-	4
	12	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	13	-	-	1 24.5	-	1 21.0	-	-	-	-	4 10.6	-	-	1 13.0	7
	14	3 4.6	-	1 19.7	-	-	-	-	1 11.5	-	1 5.9	-	-	-	6
	15	1 5.3	-	-	-	1 21.4	-	-	-	-	-	-	-	-	2
	16	-	-	2 25.3	-	-	-	-	-	-	-	-	-	-	2

Table 7 (cont'd)

Area	Bongo station number	Larval count and mean standard length (mm) by family classification[1]													Total count
		HN	CL	OS	GA	ST	BA	AM	SC	HE	CO	AG	CY	PL	
Bonilla Is. to Two Peaks	17	-	-	4 26.4	-	-	-	-	-	-	1 9.9	-	-	-	5
	18	-	1 23.7	4 24.7	-	1 26.7	1 15.5	-	-	-	1 10.6	-	-	-	8
	19	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	20	-	-	-	-	-	-	-	-	-	1 3.2	-	-	-	1
	21	1 3.0	-	-	-	-	-	-	-	-	1 4.5	-	-	-	2
	22	-	-	4 30.1	-	1 9.9	-	-	-	-	7 9.5	-	-	-	12
	23	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	24	2 3.7	-	3 24.1	-	-	1 19.0	-	-	-	9 6.0	-	1 7.2	-	16
	25	-	-	1 24.0	-	-	2 22.2	-	-	-	-	-	-	-	3
Two Peaks to McIntyre Bay	26	-	-	1 22.6	-	-	-	-	-	-	1 5.4	-	-	-	2
	27	-	-	-	-	-	1 11.8	-	-	-	2 8.6	-	-	-	3
	28	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	29	-	-	-	-	-	-	-	-	-	-	-	1 6.7	-	1
	30	2 4.0	-	-	-	-	2 16.4	-	-	-	4 4.5	-	-	-	8
	31	5 4.0	-	-	-	-	2 14.4	-	-	-	3 6.4	1 18.7	-	-	11
	32	-	-	1 28.8	-	-	-	-	-	-	-	-	-	-	1
	33	1 4.2	-	-	-	1 27.2	-	-	1 5.0	-	3 7.5	-	-	-	6

Table 7 (cont'd)

Area	Bongo station number	Larval count and mean standard length (mm) by family classification[1]													Total count
		UN	CL	OS	GA	ST	BA	AM	SC	HE	CO	AG	CY	PL	
Two Peaks to McIntyre Bay	34	1 4.3	-	-	-	-	3 21.8	-	-	-	3 5.6	-	-	-	7
	35	2	-	-	-	-	-	-	-	-	1	-	-	-	3
	36	-	-	-	4 3.7	-	1 12.5	-	-	1 5.9	1 4.3	-	-	-	7
	37	-	-	-	-	-	-	-	4 4.3	-	6 4.6	-	-	-	10
Chatham Sound	38	-	-	9 22.6	2 6.4	-	-	-	-	-	2 7.5	-	-	-	13
	39	-	-	2 14.2	-	-	-	-	-	-	2 7.2	-	-	2 8.6	6
	40	-	-	5 18.5	1 8.6	-	-	-	1 5.1	-	-	-	-	-	7
	41	-	-	3 21.9	-	-	-	-	-	-	2 5.8	-	-	-	5
	42	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	43	-	-	11 23.2	-	-	-	-	-	1 5.6	-	-	-	-	12
	44	-	-	1 12.8	-	-	-	-	-	-	7 14.4	-	1 4.2	3 8.3	12
	45	-	-	4 25.0	1	-	-	-	-	-	-	-	-	-	5
	46	2 3.6	-	6 27.5	-	-	-	-	-	-	8 8.3	-	-	-	16
	47	1 3.8	-	7 25.0	-	-	-	-	-	-	-	-	-	-	8
	48	-	-	16 20.9	1 6.1	-	-	-	-	1 6.9	-	-	-	1 10.4	19

Table 7 (cont'd)

Area	Bongo station number	Larval count and mean standard length (mm) by family classification[1]												Total count
		UN	CL	OS	GA	ST	BA	AM	SC	HE	CO	AG	CY	PL	
Banks Island	49	1	-	4	-	-	-	-	-	-	1	-	-	-	6
		22.7		31.1							16.6				
	50	-	-	-	-	-	-	-	-	-	4	-	-	-	4
											12.2				
	52	-	-	-	-	-	-	-	-	-	2	-	-	-	2
											10.0				
	54	-	-	-	-	-	-	-	-	-	3	-	2	-	5
											10.5		7.8		
	55	-	-	-	-	-	-	-	-	-	1	-	1	-	2
											5.0		15.5		
	56	-	-	-	-	-	-	-	-	-	2	-	-	-	2
											10.2				
	58	-	-	-	-	-	-	-	-	-	3	-	-	-	3
											4.3				
	60	1	-	2	-	1	-	-	-	-	7	-	-	-	11
		10.9		25.1		6.9					5.8				
	62	1	-	-	-	-	-	-	-	-	3	-	-	-	4
		9.9									4.0				
Bonilla Is. to Horseshoe	63	-	-	-	-	-	-	-	-	1	2	-	-	-	3
										13.4	8.6				
	64	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	65	-	-	-	-	-	-	-	-	1	-	-	-	-	1
										5.6					
	66	-	-	1	-	1	-	-	-	-	1	-	1	-	4
				33.0		14.2					9.1		15.4		
	67	-	-	-	-	-	-	-	-	-	5	-	-	-	5
											12.4				
	68	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	69	-	-	-	-	-	-	-	-	-	1	-	1	-	2
											6.7		5.3		

Table 7 (cont'd)

Area	Bongo station number	Larval count and mean standard length (mm) by family classification[1]													Total count
		UN	CL	OS	GA	ST	BA	AM	SC	HE	CO	AG	CY	PL	
Bonilla Is. to Horseshoe	70	-	-	-	-	-	-	-	-	-	-	1 10.2	-	-	1
	71	-	-	1 34.0	-	-	-	-	-	-	1 4.6	-	-	-	2
	72	-	-	-	-	-	-	-	-	1 13.1	2 8.2	-	-	-	3
	73	-	-	-	-	-	-	-	-	-	-	-	-	1 12.5	1
	74	-	-	-	-	-	-	-	-	-	2 7.4	1 9.8	-	-	3
	75	-	-	-	-	-	-	-	-	-	2 4.2	-	-	-	2
	76	-	-	-	-	-	-	-	-	-	2 7.8	1 5.4	1 18.7	-	4
	77	-	-	-	-	-	-	-	-	1 6.2	-	-	2 7.7	-	3
	78	-	-	-	-	-	-	-	-	1 4.2	-	-	-	-	1
	79	-	-	-	-	1 22.4	-	-	-	1 13.0	3 11.3	-	2 11.8	-	7
Horseshoe to Laskeek Bay	80	-	-	-	-	1	-	-	-	-	5 7.6	1 17.9	-	-	7
	81	-	-	-	-	-	-	-	-	-	1 11.2	2 11.6	-	-	3
	82	-	-	-	-	-	-	-	-	-	3 8.2	-	-	-	3
	83	-	-	-	-	-	-	-	-	-	4 6.8	3 7.5	-	-	7
	84	-	-	-	-	-	-	-	-	-	2 5.1	-	-	-	2

Table 7 (cont'd)

Area	Bongo station number	Larval count and mean standard length (mm) by family classification[1]													Total count
		UN	CL	OS	GA	ST	BA	AM	SC	HE	CO	AG	CY	PL	
Horseshoe to Laskeek Bay	85	-	-	-	-	-	-	-	1 4.6	-	-	-	-	-	1
	86	-	-	-	-	1 22.7	-	-	-	-	1 11.4	1 10.4	-	-	3
	87	-	-	-	-	1 25.8	-	-	-	-	7 5.9	-	4 7.6	-	12
	88	-	-	-	-	-	-	-	-	-	23 4.6	-	2 6.0	-	25
	89	-	-	-	-	-	-	-	-	-	3 10.9	-	-	-	3
	90	-	-	-	-	-	-	-	-	-	6 7.2	-	1 4.6	-	7
	91	-	-	-	1 6.7	-	-	-	1 4.5	-	2 9.4	-	-	-	4
	92	1 4.0	-	-	-	-	-	-	-	-	2 10.7	-	-	-	3
	93	1 6.4	-	-	-	-	-	-	-	-	2 4.6	-	1 4.8	1 17.1	5
	94	-	-	-	-	-	-	-	-	-	9 6.5	-	-	-	9
	95	1 3.5	-	-	1 6.6	-	-	-	-	-	1 7.2	-	-	-	3
	96	-	-	-	-	-	-	-	-	-	3 5.4	-	-	-	3
	97	2 4.9	-	-	-	1 16.0	-	-	-	-	27 4.7	1 6.7	-	-	31
	98	1 3.8	-	-	-	-	-	-	-	-	11 6.8	-	-	-	12
	99	-	-	-	-	-	-	-	-	1 7.2	21 6.5	-	1 6.4	-	23

Table 7 (cont'd)

Area	Bongo station number	Larval count and mean standard length (mm) by family classification[1]													Total count
		UN	CL	OS	GA	ST	BA	AM	SC	HE	CO	AG	CY	PL	
Selwyn Inlet	100	2 4.0	-	-	-	-	-	-	-	-	13 5.6	1 6.9	3 5.8	-	19
Atli Inlet	101	2 3.4	-	-	-	-	-	-	1 5.0	-	9 4.7	-	-	-	12
Goose Island	102	1	-	-	-	-	-	-	-	-	1 4.2	-	-	-	2
	103	-	-	-	-	-	-	-	-	-	2 4.7	-	-	-	2
	104	-	-	-	-	-	-	-	1 5.3	-	2 6.7	-	-	-	3
Totals		50	6	128	11	12	16	0	16	11	292	14	33	9	598
Percent		8	1	21	2	2	3	0	3	2	49	2	6	2	100

[1]Footnotes:
UN - unclassified
CL - Clupeidae (herring)
OS - Osmeridiae (smelts)
GA - Gadidae (codfishes)
ST - Stichaeidae (pricklebacks)
BA - Bathylagidae (deepsea smelts)
AM - Ammodytidae (sandlance)
SC - Scorpaenidae (rockfishes)
HE - Hexagrammidae (greenlings)
CO - Cottidae (sculpins)
AG - Agonidae (poachers)
CY - Cyclopteridae (snailfishes)
PL - Pleuronectidae (flatfishes)

Table 8. Locations of hydrographic and plankton stations and water temperatures (°C) at standard depths (m) during G.B. REED Cruise, July 22 - August 8, 1985.

Station no.	Day/ month	Time (PDT)	N. Lat. °	N. Lat. '	W. Long. °	W. Long. '	Standard depths (m) 0	10	20	30	50	75	100	125	150	200	250	300	Bottom °C	Bottom Depth (m)
1	23/07	1930	51	07	128	19	13.3	11.0	10.0	8.8	8.0	7.2	6.5	6.4	6.4	-	-	-	6.4	185
5	23/07	2200	51	23	128	42	15.0	14.5	12.0	10.4	8.7	8.0	7.2	6.5	6.3	5.8	-	-	5.8	223
13	24/07	0330	52	00	129	30	13.1	10.8	10.2	8.8	7.6	7.2	6.9	6.5	6.0	6.0	-	-	6.0	206
21	24/07	1000	53	00	130	12	12.5	11.5	9.8	8.8	7.5	7.0	6.6	6.4	6.0	5.5	-	-	5.5	229
24	24/07	1415	53	30	130	46	12.6	11.5	10.5	9.8	8.0	7.5	6.5	6.4	6.0	-	-	-	6.0	165
B	24/07	1930	53	44	130	38	13.2	9.0	8.5	7.8	7.3	7.0	6.5	-	-	-	-	-	6.5	110
33	27/07	1504	54	25	131	20	14.0	11.1	9.1	8.3	7.2	6.6	6.3	6.1	5.8	5.8	-	-	5.8	220
C	28/07	0635	54	11	131	56	12.8	11.6	9.8	8.8	7.6	6.8	-	-	-	-	-	-	6.5	91
D	30/07	1415	54	31	130	31	15.0	8.5	7.3	7.0	6.7	6.5	-	-	-	-	-	-	6.4	91
E	03/08	1645	52	31	131	12	14.2	13.8	13.0	12.3	11.0	8.0	7.5	7.1	6.5	-	-	-	6.5	150
15	05/08	0054	52	00	130	31	14.0	12.5	11.1	9.8	8.8	7.5	7.0	6.8	6.5	6.0	5.8	5.8	5.8	437
10	05/08	0420	51	36	130	03	13.3	13.2	11.7	9.7	7.9	7.0	6.4	6.2	6.0	5.7	5.6	5.5	5.3	344
8	05/08	0752	51	07	129	37	14.6	12.5	9.4	8.7	8.0	7.3	7.0	6.8	6.6	6.5	6.0	6.0	5.8	380

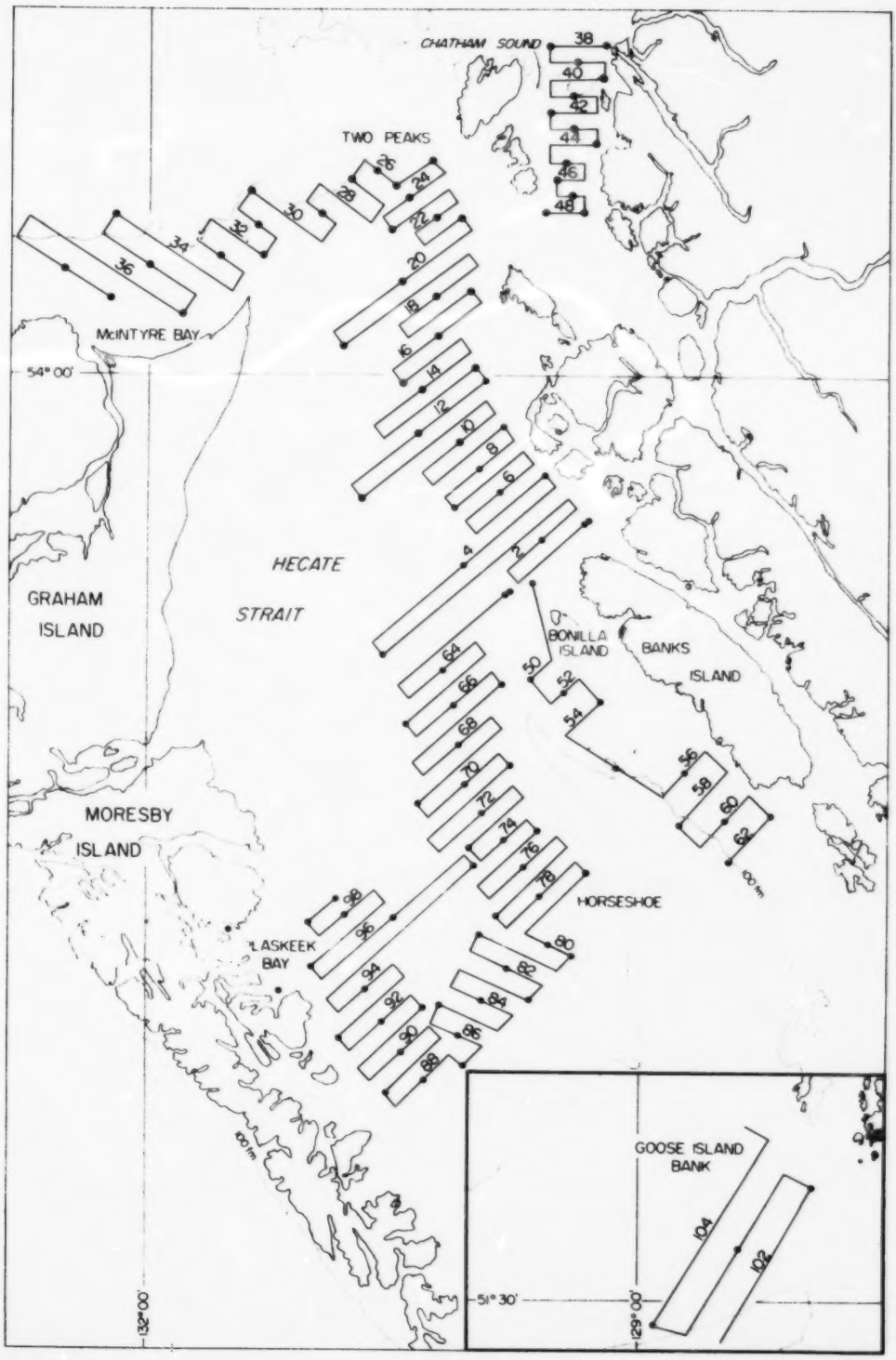

Fig. 1. Chart of Hecate Strait showing cruise tracks and bongo stations during G.B. REED Herring Cruise No. 85-8, July 22-August 8, 1985.

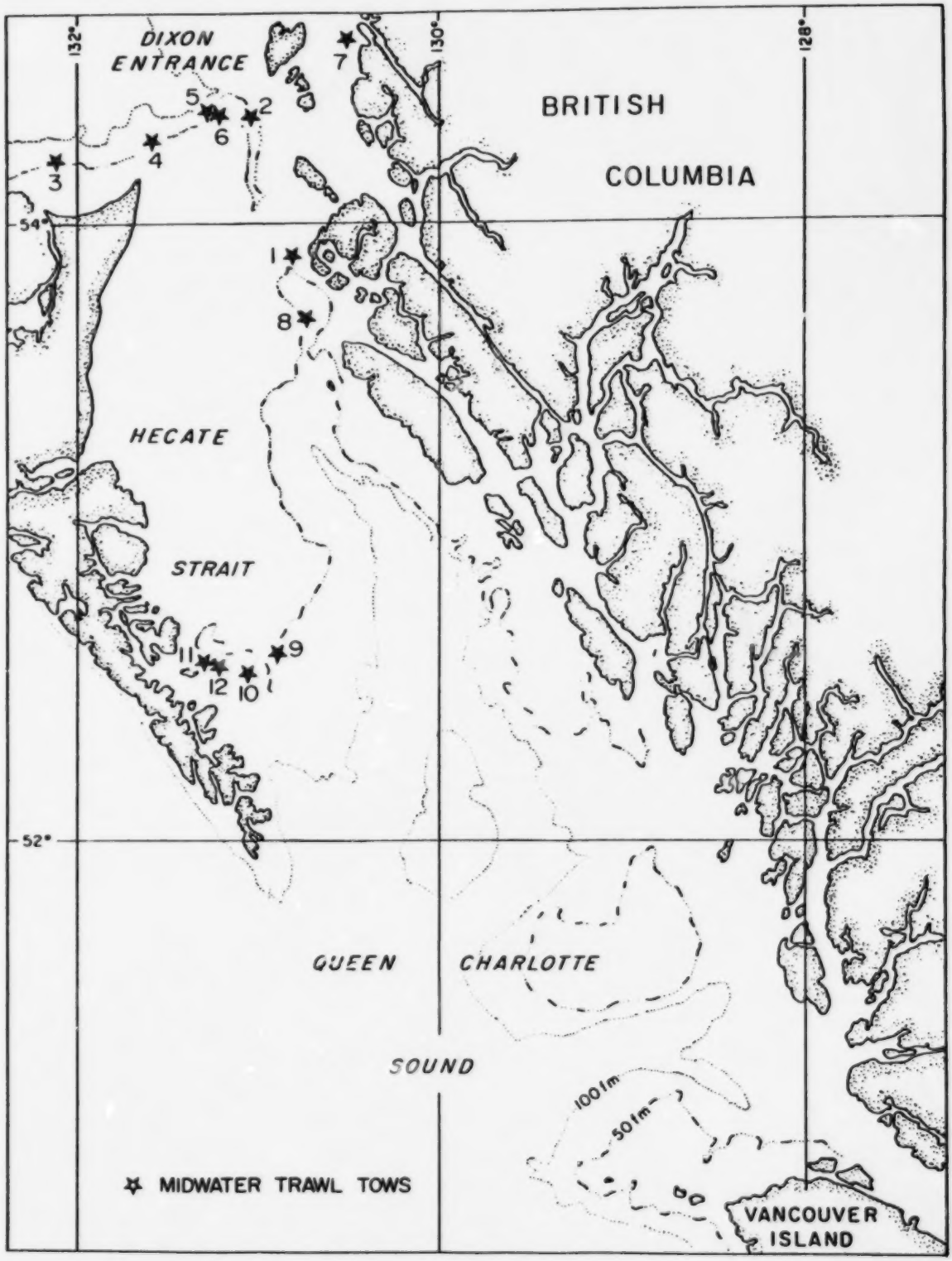

Fig. 2. Chart of Queen Charlotte Sound and Hecate Strait showing locations of midwater trawl tows during G.B. REED Herring Cruise No. 85-8, July 22-August 8, 1985.

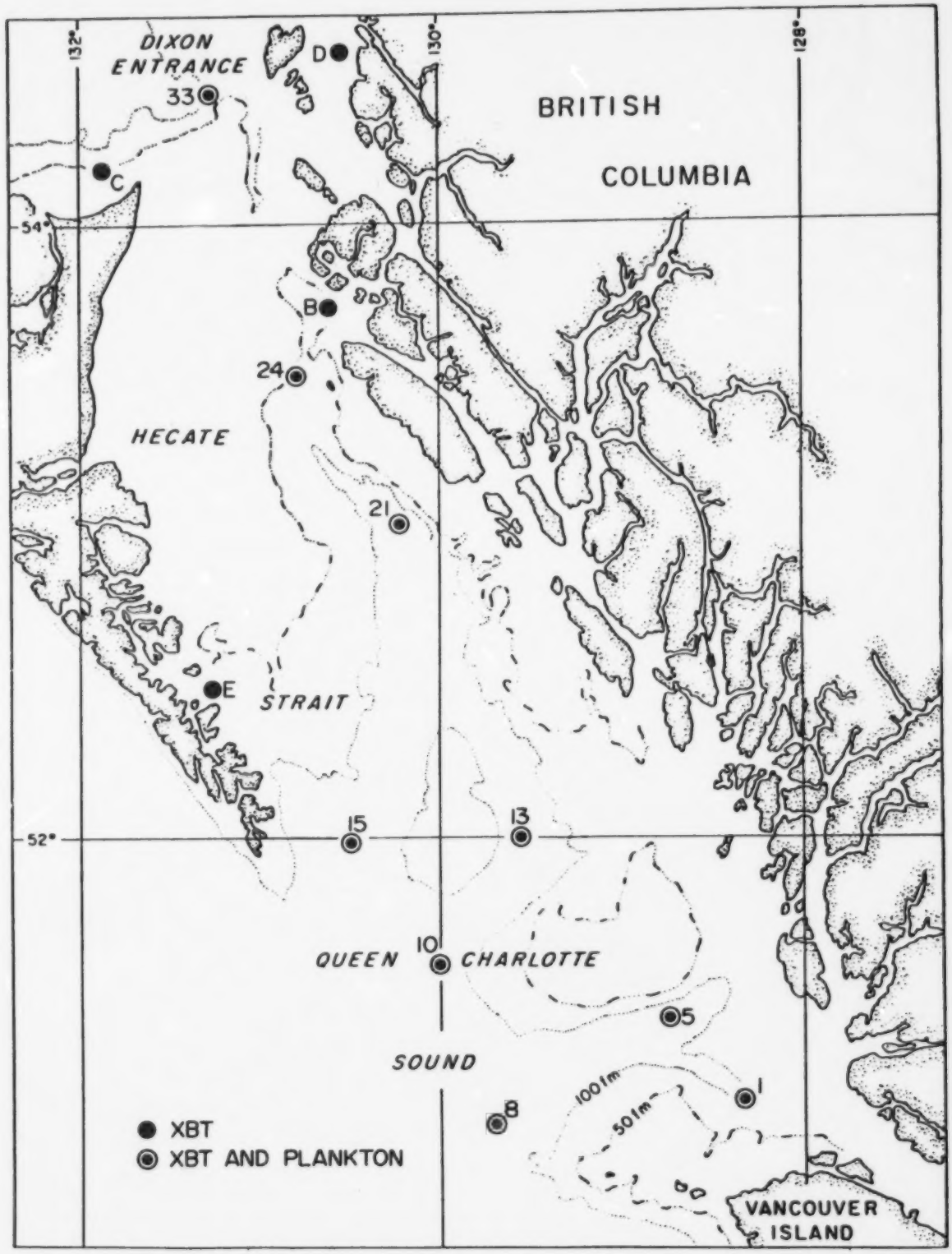

Fig. 3. Chart of Queen Charlotte Sound and Hecate Strait showing locations of XBT and plankton stations occupied during G.B. REED Herring Cruise No. 85-8 July 22-August 8, 1985.